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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|----------------------|--------------------------|------------------------|
| 10/774,115 | 02/06/2004 | Glen C. Shepherd | Solectron 735 | 8375 |
| Robert Moll 1173 St. Charles Court Los Altos, CA 94024 | | | EXAMINER DINH, TUAN T | |
| | | | ART UNIT 2841 | PAPER NUMBER |
| | | | MAIL DATE 09/10/2007 | DELIVERY MODE PAPER |

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary

Application No.

10/774,115

Applicant(s)

SHEPHERD ET AL.

Examiner

Tuan T. Dinh

Art Unit

2841

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) 30-33 and 35 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-29 and 34 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 06 February 2004 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- ☐ Notice of References Cited (PTO-892)
- ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date _____
- ☐ Notice of Informal Patent Application
- ☐ Other: _____

DETAILED ACTION

Claims 34 is now rejoined to the group I (claims 1-29).

Drawings

Figures 1, and 2A-2B should be designated by a legend such as **--Prior Art--** because only that which is old is illustrated. See MPEP § 608.02(g). Corrected drawings in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. The replacement sheet(s) should be labeled "Replacement Sheet" in the page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the drawing figures. If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1-2, 9-15, and 22-29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dishongh ('31) in view of Prior Art (figures 1, and 2A-2B), hereafter APA.

As to claim 1, Dishongh et al. discloses a substrate (120) as shown in figure 1 with a via (130) and pad structure (122,124), comprising:

- a substrate (120),
- a plated via (130 having plated 132) connected to conductive layers (not show, but the PCB 120 having plurality of conductor layers, see column 1, lines 30-32),
- a solder mask (160) surrounding the plated via (130); and
- a conductive pad (122, 124) with a conductive trace connected to the plated via (130), wherein the solder mask (160) exposes a part of the conductive pad (122) that extends beyond the terminal sides (solder balls 112) of a component (BGA package 110) to increase solder formation at the terminal sides.

Dishongh does not disclose the BGA component, which is a SMT component. APA shows a SMT component (33) connected on a substrate (10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of APA employed in the substrate of Dishongh in order to provide easy to assembly and rework.

As to claim 14, Dishongh et al. discloses a substrate (120) with a plurality of via and pad structures as shown in figures 1-4, comprising: a substrate (120), first and second plated vias (130) connected to the conductive layers, first and second solder masks (160) surrounding the first and second plated vias (130); first and second conductive pads (122, 124) each with a conductive trace connected to the first and second plated vias (130), wherein the solder masks (160) each exposes a part of first and second conductive pad extends beyond the terminal sides of the component to

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increase solder formation along the terminal sides. Dishongh does not disclose the BGA component, which is a SMT component. APA shows a SMT component (33) connected on a substrate (10).

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of APA employed in the substrate of Dishongh in order to provide easy to assembly and rework.

As to claims 2, 15, Dishongh et al. as modified by APA discloses the solder mask (160) reduces solder formation at the terminal end of the component (110).

As to claims 9-11, 22-25, and 29, Dishongh et al. as modified by APA discloses the solder mask (160) is a ring or keyhole shaped, the solder mask covers the substrate partially or entirely except the conductive pad and the plated via, and further comprising a component (110) electrically connected to the conductive pad through solder joint(s) (112), wherein the solder joints have a greater volume at the terminal sides than at the terminal end of the component.

As to claim 12-13, and 27-28, Dishongh et al. as modified by APA discloses the substrate (120) is part of a printed circuit board or a BGA package

As to claim 26, Dishongh et al. as modified by APA discloses the separation along the substrate (120) between the first and second solder masks (160) defines the length of the component to be soldered.

As to claim 34, Dishongh as modified by APA discloses the first conductive pad extends beyond the terminal side of the maximum distance that reduces solder wicking

without generating component electrical shorts between the first conductive pad and an adjacent plated via.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 3-8, and 16-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Dishongh et al. ('631) in view of APA and further in view of Osann, Jr. et al. (US 5,384,433).

As to claims 3-8, and 16-21, Dishongh et al. and APA do not disclose the conductive pad including first and second arms and a body or a T-shaped structure that extend beyond the terminal sides of the component, the first arm and the second arm are symmetrically disposed on the substrate with respect to the plated via.

Osann, Jr. et al. teach a pad structure (see figure 2) having two arms and a body or a T-shaped pad structure that extend beyond the terminal sides of the component, the first arm and the second arm are symmetrically disposed on the substrate with respect to the plated via.

It would have been obvious to one having ordinary skill in the art at the time the invention was made to have a teaching of Osann employed in the pad structure of

Dishongh et al. and APA in order to provide strong bonding and electrical connection between components and a board.

Response to Arguments

Applicant's arguments with respect to claims 1-29 and 34 have been considered but are moot in view of the new ground(s) of rejection.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tuan T. Dinh whose telephone number is 571-272-1929. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Reichard Dean can be reached on 571-272-1984. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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Tuan Dinh
August 20, 2007.

A handwritten signature in black ink, appearing to read 'Tuan T. Dinh', with a long, sweeping horizontal line extending to the right.

TUAN T. DINH
PRIMARY EXAMINER